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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,297	03/25/2004	Kiyoshi Chikamatsu	40020852-02	1500

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EXAMINER

WEST, JEFFREY R

ART UNIT	PAPER NUMBER
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2857

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/809,297

Applicant(s)

CHIKAMATSU, KIYOSHI

Examiner

Jeffrey R. West

Art Unit

2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,6,8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6,8 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings in Figures 3B, 7A, 7B, and 9B are objected to because they contains reference characters/numbers that are too small and/or blurred to be legible.
2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

On page 12, line 10, "A/D converter 830" should be ---A/D converter 850---.

Appropriate correction is required.

4. The specification is objected to because the tables presented on pages 17 and 22 contain entries that are too small and/or blurred to be legible.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1, 3, 5, 6, 8, and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 is rejected as failing to comply with the written description requirement because it recites, "wherein said first filter and said second filter are digital filters, and said impulse response of each of said first filter and said second filter has a

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natural number that is a multiple of one period of said pre-determined frequency signal”.

The specification, however, only provides the following support on page 12, lines 5-14:

N is an integer of 2 or higher. The output signals of mixer 810 are input through low-pass filter 830 and buffer amp 840 to A/D converter 850. A/D converter 850 samples the input signals at a sampling frequency f_s . Sampling frequency f_s is a frequency that is the 4m multiple of the frequency f_{IF} of the signal under test. Moreover, the cut-off frequency f_c of low-pass filter 830 is set so that it can also function as the anti-alias filter for A/D converter 830.

$$f_s = 4m \cdot f_{IF}$$
$$f_c \leq \frac{1}{2} f_s$$

m is a natural number. Sampled signal data $V(n)$ are processed by filter 860 and filter 865 and output.

and on page 22, lines 6-14:

Impedance measuring apparatus 200 of the first embodiment can be further improved when the above-mentioned type of high-speed A/D converter is used. An example is described below as a second embodiment of the present invention. Filter 860 and filter 865 of impedance measuring apparatus 600 are replaced with filter 870 and filter 875. Moreover, filter 870 and filter 875 have an averaging device A_v in front of filter 860 and filter 865. The sampling frequency of the A/D converter of the impedance measuring apparatus of the second embodiment is changed to f_{sx} .

$$f_{sx} = (4m \cdot x) \cdot f_{IF}$$

These sections indicate that a sampling frequency is determined as a multiple of the frequency of the pre-determined frequency signal but do not adequately support a limitation for "wherein said first filter and said second filter are digital filters, and said impulse response of each of said first filter and said second filter has a natural number that is a multiple of one period of said pre-determined frequency signal"

Page 12, line 15 to page 13, line 5 does mention the use of a period determined from the inverse of the sampling frequency:

Filter 860 and filter 865 are linear FIR digital filters. The inside block of filter 860 and filter 865 is shown in Figure 3A and Figure 3B. T in Figure 3A and Figure 3B is the time delay that is equal to the inverse of sampling frequency f_s . Filter 860 and filter 865 have response characteristics represented by the following formulas based on the effect of filter coefficients $h_{00}(k)$ and $h_{90}(k)$.

$$V_{00}(n) = \sum_{k=0}^{4m-1} h_{00}(k) \cdot V(n-k)$$
$$V_{90}(n) = \sum_{k=0}^{4m-1} h_{90}(k) \cdot V(n-k)$$

Here,

$$h_{00}(k) = \frac{\sin\left(\frac{\pi}{2m}k + \theta\right)}{2m}$$
$$h_{90}(k) = \frac{\cos\left(\frac{\pi}{2m}k + \theta\right)}{2m}$$

θ is any value.

but still fails to provide adequate support for “wherein said first filter and said second filter are digital filters, and said impulse response of each of said first filter and said second filter has a natural number that is a multiple of one period of said pre-determined frequency signal”

Claims 3, 6, and 8 are rejected for similar reasons because they contain similar limitations.

Claims 5 and 10 are rejected under 35 U.S.C. 112, first paragraph, because they incorporate the lack of written description of their respective parent claims.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1, 3, 5, 6, 8, and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is considered to be vague and indefinite because it recites "wherein said first filter and said second filter are digital filters, and said impulse response of each of said first filter and said second filter has a natural number that is a multiple of one period of said pre-determined frequency signal". In this limitation, it is unclear to one having ordinary skill in the art what it means for a filter to "have a natural number".

Claims 3, 6, and 8 are rejected for similar reasons because they contain similar limitations.

Claims 3 and 8 are further considered to be vague and indefinite because they recite "wherein an [the] impulse response of said first filter is weighted by a sine function of the frequency of said pre-determined frequency signal after frequency conversion by said frequency converter, and an [the] impulse response of said second filter is weighted by a cosine function of the frequency of the pre-determined frequency signal after frequency conversion by the frequency converter". In this limitation, it is unclear to one having ordinary skill in the art whether it is the

weighting that is performed using the pre-determined frequency signal's original frequency after the frequency conversion has been performed or the weighting is performed using the predetermined frequency signal with a frequency after it has already been converted.

Claims 5 and 10 are rejected under 35 U.S.C. 112, second paragraph, because they incorporate the lack of clarity present in their respective parent claims.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 3, and 5, as may best be understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,808,463 to Nagano in view of U.S. Patent No. 6,104,764 to Ohta et al.

With respect to claims 1 and 3, Nagano discloses a vector-detecting apparatus that detects the in-phase component and the quadrature-phase component of a pre-determined frequency signal, said apparatus comprising a frequency converter (column 5, lines 6-12), a first digital filter, and a second digital filter (column 6, line 34), wherein said first and second filters filter the output signal of said frequency converter and whose impulse responses are orthogonal to each other (column 5,

lines 30-34), and wherein the output of said first filter is regarded as the in-phase component of said pre-determined frequency signal, and the output of said second filter is regarded as the quadrature-phase component of said pre-determined frequency signal (column 5, lines 34-38).

Nagano further discloses that the response of said first filter is weighted by the sine function of the same frequency as said pre-determined frequency signal after frequency conversion by said frequency converter, and the impulse response of said second filter is weighted by the cosine function of the same frequency of the same pre-determined frequency signal after frequency conversion by the frequency converter (column 5, lines 53-64).

With respect to claim 5, Nagano discloses that the ratio of the frequency of said pre-determined frequency signal before conversion by said frequency converter and the frequency after conversion by said frequency converter is an integer of 2 or higher (column 5, lines 22-29 and column 8, lines 17-32).

As noted above, the invention of Nagano teaches many of the features of the claimed invention and while the invention of Nagano does teach first and second I and Q response digital filters, Nagano does not specifically teach that the impulse response of the first and second filters have a natural number that is a multiple of one period of the pre-determined frequency signal.

Ohta teaches a radio receiving apparatus for receiving communication signals of different bandwidths comprising means for receiving a signal (column 12, lines 36-39), frequency converting the received signal (column 12, lines 42-45) and low pass

digital filtering the signal using I and Q response filters (column 13, lines 11-15), wherein the low pass filters have an impulse response that has a natural number (i.e. integer) that is a multiple of one period of the received signal (column 28, lines 33-39 and column 29, lines 16-26).

It would have been obvious to one having ordinary skill in the art to modify the invention of Nagano to specifically teach that the impulse response of the first and second filters have a natural number that is a multiple of one period of the pre-determined frequency signal, as taught by Ohta, because, as suggested by Ohta, the combination would have provided a means for eliminating unwanted high-frequency signals, such is the purpose of the low-pass filters of Nagano, while improving the accuracy of the resulting signal by reducing the likelihood of sampling the signal at zero values (column 28, lines 33-39 and column 29, lines 16-26).

11. Claims 6, 8, and 10, as may best be understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagano in view of Ohta and further in view of U.S. Patent No. 4,888,701 to Wakasugi et al.

As noted above, the invention of Nagano and Ohta teaches all of the features of the claimed invention except for explicitly stating that the apparatus of Nagano and Ohta is used as part of an impedance measuring apparatus.

Wakasugi teaches an apparatus for measuring a vector voltage ratio including a plurality of phase detectors connected to a plurality of A/D converters (column 3, lines 2-6) for detecting in-phase and quadrature-phase vectors (i.e. vectors with

phase components 90 degrees from each other) (column 3, lines 29-37) for use in measuring impedance (column 4, lines 16-30).

It would have been obvious to one having ordinary skill in the art to modify the invention of Nagano and Ohta to explicitly state that the apparatus of Nagano and Ohta is used as part of an impedance measuring apparatus because the invention of Wakasugi suggests that impedance measuring apparatuses require accurate measurements of in-phase and quadrature-components (column 1, lines 6-25) and therefore the combination would have provided a wider variety of applications of the invention of Nagano and Ohta by applying the in-phase and quadrature phase detection means to an impedance measuring apparatus.

Further, the limitation specifying the use of the apparatus of Nagano and Ohta as part of an impedance measuring apparatus is considered to be a recitation of intended use. It has been held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case, since the structure of Nagano and Ohta could be used in any of a plurality of apparatuses, including an impedance measuring apparatus, it meets the claim.

Further still, Applicant admits as Prior Art in the Background of the Invention that it is well-known in the art to use in-phase and quadrature detection in impedance measuring devices. Therefore, it would have been obvious to one having ordinary

skill in the art to conform to what is common in the art by applying the method of Nagano to a conventional impedance measuring apparatus. *When applicant states that something is prior art, it is taken as being available as prior art against the claims. Admitted prior art can be used in obviousness rejections. In re Nomiya, 509 F.2d 566, 184 USPQ 607, 610 (CCPA 1975).*

Response to Arguments

12. Applicant's arguments with respect to claims 1, 3, 5, 6, 8, and 10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent Application Publication No. 2004/0070766 to Szafraniec teaches a method and apparatus for a Jones Vector based heterodyne optical polarimeter including the use of two orthogonal filters to determined in-phase and quadrature components.

U.S. Patent No. 6,724,832 to Hershberger teaches a vestigial sideband generator including two low-pass filters for producing folded orthogonal base-band components of I (i.e. in-phase) and Q (i.e. quadrature).

U.S. Patent No. 6,704,324 to Holmquist teaches an apparatus and method for transmission of voice band signals over a DSL line including determining in-phase and quadrature components in accordance with orthogonal Hilbert pass-band filters.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jrw
March 20, 2006



CAROL S.W. TSAI
PRIMARY EXAMINER